Notice No. 7

Rules and Regulations for the Classification of Special Service Craft, July 2013

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Issue date: July 2014

Amendments to	Effective date
Part 1, Chapter 3, Section 10	1 July 2014
Part 3, Chapter 6, Sections 1, 2, 3, 4, 5 & 7	1 July 2014
Part 15, Chapter 1, Section 5	1 July 2014
Part 16, Chapter 1, Sections 1, 2 & 3	1 July 2014
Part 16, Chapter 2, Sections 1, 6, 7, 9, 10, 11, 12, 14, 18, 19 & 20	1 July 2014
Part 17, Chapter 3, Section 3	1 July 2014
Part 17, Chapter 4, Sections 1 & 3	1 July 2014

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Part 1, Chapter 3

Periodical Survey Regulations for Service Craft

Effective date 1 July 2014

■ *Section 10*
Electrical equipment

10.2 Complete Surveys

10.2.4 Air circuit-breakers for essential or emergency services and rated at 800 A and above are to be surveyed to ensure that the manufacturer's recommended number of switching options has not been exceeded. *See* Vol 7, Pt 16, Ch 2,7.3.6. Where a breaker is not fitted with an automatic counter, a written record is to be kept.

Existing paragraphs 10.2.4 *to* 10.2.5 *have been renumbered* 10.2.5 *to* 10.2.6.

~~10.2.6~~ 10.2.7 Where transformers or electrical apparatus associated with supplies to essential services are ~~liquid filled or cooled by a liquid in direct contact with current carrying parts~~ liquid-immersed, the ~~o~~Owner is to arrange for samples of the liquid to be taken and tested~~,~~ for dissolved gases, breakdown voltage, acidity and moisture by a competent authority, in accordance with the equipment manufacturer's requirements, and a certificate giving the test results is to be ~~furnished~~ made available to the Surveyor on request.

Existing paragraphs 10.2.7 *to* 10.2.9 *have been renumbered* 10.2.8 *to* 10.2.10.

~~10.2.10~~ 10.2.11 Where the craft is electrically propelled, the propulsion motors, generators, propulsion transformers, propulsion conversion equipment, cables, harmonic filters, neutral earthing resistors, dynamic braking resistors and all ancillary electrical ~~gear~~ equipment that forms part of the propulsion drive and control system, exciters and ventilating plant (including coolers) associated therewith are to be ~~examined~~ surveyed, and the insulation resistance to earth is to be tested. Special attention is to be given to windings, commutators and slip-rings. Where practicable, the low voltage and high voltage windings of resin cast propulsion transformers are to be subjected to boroscopic inspection, to assess the physical condition of their insulation and for signs of mechanical and thermal damage.The operation of protective gear and alarm devices is to be checked, so far as is practicable. ~~Liquids for filling and cooling~~ Insulating oil, if used, ~~are~~ is to be tested in accordance with ~~10.2.6~~ 10.2.7. Interlocks intended to prevent unsafe operations or unauthorised access are to be checked to verify that they are functioning correctly. Emergency overspeed governors are to be tested.

Existing paragraph 10.2.11 *has been renumbered* 10.2.12.

Part 3, Chapter 6

Passenger and Crew Accommodation Comfort

Effective date 1 July 2014

■ *Section 1*
General requirements

1.1 Scope

1.1.3 ~~Compliance with these Rules is optional.~~ The requirements of this Chapter may be applied where no other statutory requirements exist.

1.1.5 Spaces that comply with the noise level limits specified in Table 6.2.5 and under Acceptance Numeral 3 in Tables 6.2.2 and 6.2.4, will meet the requirements of section 4 of IMO Resolution MSC.337(91), when measured in accordance with the requirements of Section 4.

1.1.6 Spaces that comply with the noise level limits specified under Acceptance Numerals 1 and 2 in Tables 6.2.2 and 6.2.4, will achieve enhanced levels of passenger and crew comfort as applicable, when measured in accordance with the requirements of Chapters 2 and 3 of IMO Resolution MSC.337(91). All vessels can apply for Acceptance Numerals 1 and 2.

Existing paragraphs 1.1.5 *to* 1.1.8 *have been renumbered* 1.1.7 *to* 1.1.10.

1.2 Definitions

1.2.4 **Vibration level** is defined by the application of ~~either of the two versions of the~~ ISO 6954:2000 ~~Standard~~:

~~(a) Where ISO 6954:1984 is applied, the vibration level is defined as the single amplitude peak value of deck structure vibration during a period of steady state vibration, representative of maximum repetitive behaviour, in mm/s, over the frequency range 5 to 100 Hz. For frequencies below 5 Hz, the requirements for vibration levels follow constant acceleration curves corresponding to the acceleration at 5 Hz.~~

~~(b) Where ISO 6954:2000 is applied, t~~The vibration level is defined as the overall frequency weighted r.m.s. value of vibration during a period of steady-state operation over the frequency range 1 to 80 Hz.

~~In general, ISO 6954 2000 is the preferred standard to be applied, however ISO 6954 1984 may be applied where there are practical difficulties in the application of ISO 6954 2000 and this has been agreed between the Owner and Builder.~~

■ *Section 2*
Noise

2.3 Crew accommodation and work areas

2.3.2 Crew space insulation is to comply with the requirements of IMO Resolution ~~A.468(XII)~~ MSC.337(91).

~~Table 6.2.4 Crew accommodation – Maximum~~ noise levels in dB(A)

~~Location~~		~~Acceptance Numeral~~		
		~~1~~	~~2~~	~~3~~
~~Sleeping cabins, hospitals~~		~~52~~	~~55~~	~~60~~
~~Day cabins~~		~~55~~	~~60~~	~~60~~
~~Office conference rooms~~		~~55~~	~~60~~	~~65~~
~~Mess rooms, lounges, reception areas:~~	~~Within accommodation~~	~~57~~	~~60~~	~~65~~
	~~On open decks~~	~~65~~	~~70~~	~~75~~
~~Alleyways, changing rooms, bathrooms, lockers~~		~~70~~	~~75~~	~~75~~
~~NOTE The levels may be exceeded by 5dB(A) within 3 m of a ventilation inlet/outlet or machinery intake/uptake on open decks.~~				

Table 6.2.4 Crew accommodation – Maximum noise levels in dB(A)

Location	Acceptance Numeral			
	1	2	3	
			Ships <10,000 grt	Ships ≥10,000 grt
Sleeping cabins, hospitals	50	53	60	55
Offices, conference rooms and day cabins	55	58	65	60
Mess rooms, lounges, reception areas and recreation rooms within accommodation	55	58	65	60
Recreational areas on open deck	67	72	75	75
Alleyways, changing rooms, bathrooms, lockers	70	75	75	75
NOTE The levels may be exceeded by 5dB(A) within 3 m of a ventilation inlet/outlet or machinery intake/uptake on open decks.				

(*Part only shown*)

Table 6.2.5 Crew work areas – maximum noise levels in dB(A)

Location	dB(A) level
Workshops and non-specified work spaces	85
Machinery control rooms	75
Wheelhouse	65
~~Bridge wing, additional limits:~~ ~~• 250 Hz band~~ ~~• 500 Hz band~~	~~68~~ ~~63~~
Look-out posts e.g., at bridge wing or window Additional limits: • 250 Hz band • 500 Hz band (measured according to IMO A.343(IX))	70 68 63

2.4 Maximum noise levels

2.4.2 Guidance on maximum acceptable sound pressure levels and noise exposure limits for crew spaces is given in IMO Resolution ~~A.468(XII)~~ MSC.337(91).

2.5 Impact insulation

(*Part only shown*)

Table 6.2.6 Passenger cabins normalised impact maximum sound pressure level $L_{n,w}$

Location	dB
Below dance floors, theatre or sports rooms	~~47~~ 45

Section 3
Vibration

3.1 Assessment criteria

Table 6.3.1 High speed craft – Maximum vibration levels

Standard:	~~ISO 6954:1984~~			ISO 6954:2000		
Units:	~~Peak velocity (5–100 Hz)~~			Frequency weighted (1–80 Hz) velocity mm/s rms		
	Acceptance Numeral					
Location	~~1~~	~~2~~	~~3~~	1	2	3
Public spaces	~~2,5~~	~~4,0~~	~~5,0~~	2,5	3,2	3,6

Table 6.3.2 Yacht – Maximum vibration levels

Standard:	~~ISO 6954:1984~~			ISO 6954:2000		
Units:	~~Peak velocity (5–100 Hz)~~			Frequency weighted (1–80 Hz) velocity mm/s rms		
	Acceptance Numeral					
Location	~~1~~	~~2~~	~~3~~	1	2	3
Cabins and lounges	~~1,0~~	~~2,0~~	~~3,0~~	1,8	2,0	2,5
Public spaces	~~1,5~~	~~3,0~~	~~4,0~~	2,5	2,9	3,3
Open recreation decks	~~2,0~~	~~3,5~~	~~4,0~~	2,5	3,2	3,8
NOTE The vibration level may be exceeded by 0,3 mm/s in the yacht's aft body directly above the propellers.						

Table 6.3.3 Crew spaces – Maximum vibration levels

Standard:	~~ISO 6954:1984~~	ISO 6954:2000
Units:	~~Peak velocity (5–100 Hz)~~	Frequency weighted (1–80 Hz) velocity mm/s rms
Location		
Accommodation and navigation spaces	~~5,0~~	3,5
Work spaces	~~6,0~~	5,0

~~*3.1.5* The vibration levels for ISO 6954:1984 are stated as peak vibration velocity amplitude. If root mean square levels are measured, each frequency component may be converted to peak vibration velocity amplitude by application of a 1,41 multiplication factor where the ISO 6954:1984 is used for assessment against Tables 6.3.1 to 6.3.3. An approximation of maximum repetitive values may be obtained for direct comparison with the graph in ISO 6954 1984 by further application of the 1,8 conversion factor as stated in the 'Interim guidelines' note of the standard.~~

3.2 Passenger accommodation and public spaces

3.2.2 No more than 20 per cent of all passenger spaces/areas and public spaces should exceed the relevant vibration criteria specified in Tables 6.3.1 and 6.3.2 by more than 0,3 mm/s~~ whether using ISO 6954:2000 or ISO 6954:1984~~.

Section 4
Testing

4.2 Test conditions

4.2.1 Test conditions for the surveys are to be in accordance with those detailed in ISO 2923 and ~~ISO 6954:1984 or~~ ISO 6954:2000, as applicable.

4.3 Noise measurements

4.3.1 Noise measurements are to be conducted in accordance with ISO 2923 and IMO Resolution ~~A.468(XII)~~ MSC.337(91). Measurements of noise levels are to be carried out using precision grade sound level meters conforming to IEC 60651, Type 1 or 2. Subject to demonstration, equivalent Standards are acceptable.

4.4 Noise measurement locations

4.4.1 Measurement locations are to be chosen so that the assessment represents the overall noise environment on board the ship. In addition to the requirements of IMO Resolution ~~A.468(XII)~~ MSC.337(91) for crew spaces, all public spaces and all passenger spaces are to be measured.

4.5 Vibration measurements

4.5.1 Vibration measurements are to be conducted in accordance with ~~ISO 6954:1984 or~~ ISO 6954:2000.

■ *Section 5*
Noise and vibration survey reporting

5.2 Noise

(*Part only shown*)
5.2.1 The reporting of results is to comply with ISO 2923 and IMO Resolution MSC.337(91), and is to include:

5.3 Vibration

(*Part only shown*)
5.3.1 The report is to contain the following information:

~~(c) Where ISO 6954:1984 is used, the maximum peak vibration levels and their corresponding frequencies taken from the frequency spectra, tabulated for all measurement locations.~~

Paragraphs (d) *to* (g) *have been renumbered* (c) *to* (f).

■ *Section 7*
Referenced standards

7.1 Noise

(*Part only shown*)
7.1.1 The following National and International Standards for noise are referred to in these Rules:

- ~~IMO Resolution A.468(XII), *Code on noise levels on board ships.*~~
- IMO Resolution MSC.337(91), *Adoption of the code of noise levels on board ships.*

7.2 Vibration

(*Part only shown*)
7.2.1 The following National and International Standards for vibration are referred to in these Rules:

- ~~ISO 6954:1984, *Mechanical vibration and shock – Guidelines for the overall evaluation of vibration in merchant ships.*~~

Part 15, Chapter 1

Piping Design Requirements

Effective date 1 July 2014

■ *Section 5*
Carbon and low alloy steels

5.8 Other mechanical couplings

(*Part only shown*)
Table 1.5.7 Application of mechanical joints depending on class of piping

Types of joints	Classes of piping systems		
	Class I	Class II	Class III
Compression couplings			
Swage type	~~–~~+	~~–~~+	+
Bite type	+(OD ≤ 60,3 mm)	+(OD ≤ 60,3 mm)	+
Flared type	+(OD ≤ 60,3 mm)	+(OD ≤ 60,3 mm)	+
Press type	–	–	+

KEY
+ Application is allowed
– Application is not allowed

Part 16, Chapter 1

Control Engineering Systems

Effective date 1 July 2014

■ *Section 1*

General requirements

1.1 General

~~*1.1.2* Section 2 states requirements for alarm systems, safety systems and automatic or remote controls where fitted.~~

~~*1.1.3* Section 4 states requirements which shall apply where it is intended to operate the craft with machinery spaces unattended. In general, craft complying with the requirements of Section 4 will be eligible for the class notation **UMS**.~~

~~*1.1.4* Section 5 states requirements which shall apply where it is intended to operate the craft with machinery spaces under continuous supervision from a centralised control station. In general, craft complying with the requirements of Section 5 will be eligible for the class notation **CCS**.~~

1.1.2 Control engineering systems are to:

- provide control of required services and habitability requirements during defined operational conditions. This is to include, but is not limited to, power generation, propulsion and their associated services;
- provide control of the engineering systems necessary to ensure availability of essential and emergency safety systems during all normal and reasonably foreseeable abnormal conditions;
- provide control of the engineering systems necessary to ensure transitional power supplies remain available;
- be suitably protected against damage to itself under fault conditions and to prevent injury to personnel; and
- not fail in a way which may cause machinery and systems located in hazardous areas to create additional fire or explosion risk.

Existing paragraph 1.1.5 *has been renumbered* 1.1.3.

1.2 ~~Plans and information~~ Documentation required for design review

1.2.1 ~~Plans and information as detailed in~~ The documentation described in 1.2.2 to 1.2.7 ~~are~~ is to be submitted ~~in triplicate~~ for design review.

1.2.4 **System operational concept**. A description of the intended operation of the control, alarm and safety systems for the main and auxiliary machinery, and other systems essential for the propulsion and safety of the ship. This description is to include a demonstration that the design provides an effective means of operation and control for all ship operating conditions.

Existing paragraph 1.2.4 *has been renumbered* 1.2.5.

~~*1.2.5*~~ *1.2.6* **Programmable electronic systems**. In addition to the documentation required by 1.2.2, the following is to be submitted:

(a) System requirements specification.
(b) System functional description.
(~~b~~c) System integration plan, *see* 2.14.2.
(~~c~~d) Failure Mode and Effects Analysis (FMEA), *see* 2.14.5.
(~~d~~e) Details of the hardware configuration in the form of a system block diagram, including input/output schedules.
(~~e~~f) Hardware certification details, *see* 2.10.5 and 2.13.3.
(~~f~~g) Software ~~quality~~ production plans, including applicable procedures, *see* ~~2.10.25~~ 2.15.4.
(~~g~~h) Factory acceptance, integration and sea trial test schedules for hardware and software.
(~~h~~j) Details of data storage arrangements, *see* 2.10.10 and 2.13.6.

Existing paragraph 1.2.6 *has been renumbered* 1.2.7.

~~*1.2.7*~~ *1.2.8* **Control station**. Plans showing the location and details of control stations, e.g., control panels and consoles. Location and details of controls and displays on each panel. ~~Details of~~ Detailed user interface specifications. A general arrangement plan of control rooms showing the position of consoles, handrails, operator area, lighting, door and window arrangements. Drawing of HVAC systems including vent arrangements.

Existing paragraph 1.2.8 *has been renumbered* 1.2.9.

~~*1.2.9* **Cables**. For details of instrumentation and control system cabling requirements, see Ch 2,11.~~

1.3 Control, alarm and safety equipment

1.3.1 ~~Major units of e~~Equipment associated with control, alarm and safety systems as defined in 1.2 ~~are~~ is to be surveyed at the manufacturers' works and the inspection and testing is to be to the Surveyor's satisfaction, *see also* 1.2.2.

1.3.4 Assessment of performance parameters, such as accuracy, repeatability, etc., are to be in accordance with an acceptable National or International Standard, e.g., IEC 60051~~,~~: *Direct acting indicating analogue electrical measuring instruments and their accessories* (all parts).

1.4 Alterations and additions

1.4.2 Details of proposed software modifications are to be submitted for consideration. ~~Where the modification may affect compliance with these Rules, proposals for verification and validation are also to be submitted.~~ Modifications are to be undertaken in accordance with defined modification processes which are part of the supplier's or system integrator's quality management system. The following documentation is to be submitted:

(a) Project-specific software modification plan.
(b) An impact analysis which identifies the effect(s) of the proposed modification. The results of the analysis are to be used to inform the extent of verification and validation that is to be applied. This analysis is to consider both the local impact and, where applicable, the system level impact of the modification.
(c) Configuration management records that satisfy the requirements of ISO 10007, to demonstrate the traceability of the proposed modification.
(d) Factory acceptance, integration and sea trial test schedules as determined by the impact analysis in (b).
(e) Updated documentation as detailed in 1.2.5.

1.4.3 Verification and validation activities are to demonstrate that the modified functionality performs as expected and that the modification has not unintentionally modified functionality outside the scope of the modification.

Existing paragraph 1.4.3 *has been renumbered* 1.4.4.

1.5 Definitions

1.5.4 Alarm System: a system which will alert relevant personnel to faults, abnormal situations and other conditions requiring attention in the machinery and the safety and control systems.

1.5.5 Control System: a system which responds to input signals from the process and/or operator and generates output signals causing the equipment under control to operate in the desired manner.

1.5.6 Failure: a loss of the ability of a structure, system or element to function within acceptance criteria.

1.5.7 Fail safe: a system design such that, when a failure occurs, the system reverts to the least hazardous state.

1.5.8 A reasonably foreseeable abnormal condition is an event, incident or failure that:
- has happened and could happen again;
- is planned for (e.g., emergency actions cover such a situation, maintenance is undertaken to prevent it, etc.).

They should be identified by:
- using analysis processes that were capable of revealing abnormal conditions;
- employing a mix of personnel including competent safety /risk professionals and those with relevant domain knowledge and understanding to apply the processes;
- referencing relevant events and historic data; and
- documenting the results of the analysis.

1.5.9 Safety System: a designated system that:
- implements the required safety functions necessary to achieve or maintain a safe state for the equipment under control; and
- is intended to achieve, on its own or with other safety systems, the necessary safety needed for the required safety functions.

1.5.10 Safe State: the state of equipment under control when safety is achieved. For some situations, a safe state only exists so long as the equipment under control is continuously controlled. Such continuous control may be for a short or indefinite period.

1.5.11 System: a set of elements which interact according to a design, where an element of a system can be another system, called a sub-system, which may be a controlling system or a controlled system, and may include hardware, software and human interaction.

■ *Section 2*
Essential features for control, alarm and safety systems

2.1 General

~~*2.1.1* Where it is proposed to install control, alarm and safety systems to the machinery and equipment listed in 1.2.2 the applicable features contained in this Section are to be incorporated in the system design.~~

Existing paragraph 2.1.2 *has been renumbered* 2.1.1.

2.2 Control stations for machinery

~~*2.2.8* For additional requirements where control stations incorporate visual display units and keyboard input facilities, *see* 2.10.~~

2.3 Alarm systems

~~*2.3.1* Where an alarm system, which will alert relevant personnel to faults, abnormal situations and other conditions requiring attention in the machinery and the safety and control systems required by this Chapter or other Sections of the Rules, is to be installed, the requirements of 2.3.2 to 2.3.20 are to be satisfied.~~

Existing paragraphs 2.3.2 *to* 2.3.20 *have been renumbered* 2.3.1 *to* 2.3.19.

2.4 Safety systems, general requirements

~~*2.4.1* Where safety systems are provided, the requirements of 2.4.2 to 2.4.12 are to be satisfied. The requirements of this sub-Section apply, where relevant, to the safety systems installed on the equipment defined in 1.2.3, including those provided in addition to those safeguards required by other Sections of the Rules.~~

Existing paragraphs 2.4.2 *to* 2.4.5 *have been renumbered* 2.4.1 *to* 2.4.4.

~~2.4.6~~ *2.4.5* The safety system is to be designed to 'fail safe'. The characteristics of the 'fail safe' operation are to be evaluated on the basis not only of the safety system and its associated machinery, but also the complete installation. Failure of a safety system is to initiate an audible and visual alarm.

Existing paragraphs 2.4.7 *to* 2.4.12 *have been renumbered* 2.4.6 *to* 2.4.11.

2.5 Control systems

~~2.5.1 Where control systems are provided, the requirements of 2.5.2 to 2.5.11 are to be satisfied.~~

Existing paragraphs 2.5.2 *to* 2.5.11 *have been renumbered* 2.5.1 *to* 2.5.10.

2.6 Bridge control for propulsion machinery

~~2.6.1 Where a bridge control system for propulsion machinery is to be fitted, the requirements of 2.6.2 to 2.6.8 are to be satisfied.~~

Existing paragraphs 2.6.2 *to* 2.6.8 *have been renumbered* 2.6.1 *to* 2.6.7.

2.10 Programmable electronic systems – General requirements

2.10.16 Display units are to comply with the requirements of an acceptable National or International Standard, e.g., IEC 60950~~:2005, *Safety of information technology equipment*~~ -1: *Information technology equipment – Safety – Part 1: General requirements*, in respect of emission of ionising radiation.

2.10.20 Software lifecycle activities, e.g., design, ~~development~~ development, supply and maintenance, are to be carried out in accordance with an acceptable quality management system. Software quality plans are to be submitted. These are to demonstrate that the provisions of ISO/IEC 90003~~:2004~~, *Software engineering – Guidelines for the application of ISO 9001:2000 to computer software*, or equivalent, are incorporated. The plans are to define responsibilities for the lifecycle activities, including verification, validation, module testing and integration with other components or systems.

2.14 Programmable electronic systems – Additional requirements for integrated systems

2.14.5 Where the integration involves control functions for essential services or safety functions, including fire, passenger, crew and craft safety, a Failure Mode and Effects Analysis (FMEA) is to be carried out in accordance with IEC 60812: *Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)*, or an equivalent and acceptable National or International Standard and the report and worksheets submitted for consideration. The FMEA is to demonstrate that the integrated system will 'fail-safe', *see* 2.4.6 and 2.5.5, and that essential services in operation will not be lost or degraded beyond acceptable performance criteria where specified by these Rules.

■ *Section 3*

Ergonomics of control stations

3.3 Physical environment

3.3.1 Control stations are to be positioned, as far as practicable, away from, or insulated against, sources of structurally transmitted vibration and noise, such as ventilation fans, engine intake fans and other noise sources.

3.3.9 ~~Chairs provided for use at control stations are to be adjustable to allow for varying heights of operators.~~ Seating provided for use at control stations is to allow for varying height and/or reach needs of operators. Seating arrangements are to minimise the need for twisting and/or turning motions by the operator.

3.5 Controls

3.5.12 Controls that affect the safe operation of the ship should be arranged so as to minimise the possibility of inadvertent operation.

3.6 Displays

3.6.2 Graphical symbols and colour coding are to be consistent. The graphical symbols of display functions are to be in accordance with a recognised International Standard, for example, ISO 14617, *Graphical symbols for diagrams* (all parts). Colour coding of functions and signals is to be in accordance with a recognised International Standard, for example, ISO 2412~~:1982~~, *Shipbuilding – Colours of indicator lights.*

Part 16, Chapter 2

Electrical Engineering

Effective date 1 July 2014

■ *Section 1*
General requirements

1.9 Ambient reference and operating conditions

1.9.3 Main and essential auxiliary machinery and equipment is to operate satisfactorily under the conditions shown in Pt 9, Ch 1,4.4. Electrical equipment satisfying alternative ambient operating condition requirements for installation on ships contained in an acceptable and relevant ~~n~~National or ~~i~~International ~~s~~Standard may be considered to satisfy this requirement.

NOTE

Details of local environmental conditions are stated in Annex B of IEC 60092-101-2002: *Electrical installations in ships – Part 101: Definitions and general requirements.*

1.11 Location and construction

1.11.1 All electrical equipment is to be constructed or selected, and installed such that:

(a) live parts cannot be inadvertently touched, unless they are supplied at the safety voltage specified in 1.12.2(h);
(b) it does not cause injury when handled or touched in the normal manner; and
(c) it is unaffected by any water, steam or oil and oil vapour to which it is likely to be exposed.

Electrical equipment having, as a minimum, the degrees of protection as specified in IEC 60092-201: *Electrical installations in ships – Part 201: System design – General* for the relevant location will satisfy these requirements.

1.11.4 Equipment design and the choice of materials are to reduce the likelihood of fire, ensuring that:

(a) where the electrical energised part can cause ignition and fire, it is contained within the bounds of the enclosure of the electrotechnical product;
(b) the design, material(s) and construction of the enclosure minimises, as far as is practicable, any internal ignition causing ignition of adjacent materials; and
(c) where surfaces of the electrotechnical products can be exposed to external fire, they do not, as far as practicable, contribute to the fire growth.

NOTE

Compliance with IEC 60695: *Fire hazard testing* (all parts), or an alternative and acceptable Standard, will satisfy this requirement, *see also* 1.16.4.

1.16 Operation under fire conditions

1.16.1 As a minimum, the following emergency services and their emergency power supplies, are required to be capable of being operated under fire conditions:

- ~~Emergency fire pump.~~
- ~~Fire safety stops, *see also* 17.6.~~
- Control and power systems to power-operated ~~water-tight~~ fire doors and status indication for all fire doors.
- Control and power systems to power-operated ~~fire~~ watertight doors and their status indication.
- Emergency lighting.
- Fire and general emergency alarms.
- Fire detection systems.
- Fire-extinguishing systems and fire-extinguishing media release alarms.
- Fire safety stops, *see also* 17.6.
- Low location lighting, *see also* 18.4.3.
- Public address systems.
- Emergency fire pump.

1.16.2 ~~Where cables for services that are required to be capable of being operated under fire conditions, including their power supplies, pass through high fire risk areas, main vertical or horizontal fire zones or decks other than those which they serve, they are to be of a fire resistant type complying with 11.5.3, and:~~

~~(a) in the case of the emergency services: the fire resistant cable is to extend, at least, from the control/monitoring panel to the nearest local junction box serving the relevant deck/area; and~~
~~(b) in the case of power supplies: the fire resistant cable is to extend, at least, from the distribution point within the space containing the emergency source of electrical power to the nearest local distribution panel serving the relevant deck/area.~~

Where cables for the emergency services listed in 1.16.1 pass through high fire risk areas, or main vertical or horizontal fire zones other than those which they serve, they are to be so arranged that a fire in any of these areas or zones does not affect the operation of the emergency service in any other area or zone. This may be achieved either by:

- cables being of a fire-resistant type complying with 11.5.3, and at least extending from the main control/monitoring panel to the nearest local distribution panel serving the relevant area or zone; or
- there being at least two-loops/radial distributions run as widely apart as is practicable and so arranged that in the event of damage by fire at least one of the loops/radial distributions remains operational.

1.16.3 Where the cables for the power supplies for the emergency services listed in 1.16.1 pass through high fire risk areas, or main vertical or horizontal fire zones other than those which they serve, they are to be of a fire-resistant type complying with 11.5.3, extending at least to the local distribution panel serving the relevant area or zone.

~~*1.16.3*~~ *1.16.4* ~~Electrical~~ Fire-resistant electrical cables for the ~~above~~ emergency services ~~required to be capable of being operated under fire conditions~~ listed in 1.16.1, including their power supplies, are to be run as directly as is practicable, having regard to any special installation requirements, for example those concerning minimum bend radii.

~~1.16.4~~ 1.16.5 In addition to 1.11.4, materials used for electrical equipment, cables and accessories within passenger accommodation areas are not to be capable of producing excessive quantities of smoke and toxic products~~, when tested in accordance with an acceptable and relevant Standard~~.

Note

Compliance with IEC 60695: *Fire hazard testing*, or an alternative and acceptable Standard, will satisfy this requirement.

1.17 Lightning protection

1.17.1 In order to minimise the risks of damage to the craft and its electrical installation due to lightning, crafts having non-metallic masts or topmasts are to be fitted with lightning conductors in accordance with the applicable requirements of IEC 60092-401: *Electrical installations in ships~~.~~ – Part 401: Installation and test of completed installation* or an alternative and relevant National Standard.

■ Section 6
System design – Protection

6.1 General

6.1.4 Protection systems are to be developed using a systematic design procedure incorporating verification and validation methods to ensure successful implementation of the requirements above. Details of the procedures used are to be submitted when requested. An approved copy of the details required by 1.2.5 and 1.2.6 is to be retained on board and made available to the Surveyor on request. Access to protection relays setpoints is to be restricted, such that they will generally only be adjusted by authorised personnel to avoid accidental operation. A record is to be kept of the initial setpoints and any subsequent changes made to them. These details are to be made available to the Surveyor on request.

6.3 Protection against overload

6.3.2 Fuses of a type intended for short-circuit protection only (e.g. fuse links complying with IEC 60269-1: *Low-voltage fuses – Part 1: General requirements*, of type “a”) are not to be used for overload protection.

6.5 Circuit-breakers

6.5.4 Circuit- breaker selection is, and ratings are, to be in accordance with the relevant requirements of IEC 60092-202: *Electrical installations in ships – Part 202: System design – Protection*. Alternative methods acceptable to LR of selecting suitable circuit-breakers may be considered.

■ Section 7
Switchgear and control gear assemblies

7.1 General requirements

7.1.1 Switchgear and control gear assemblies and their components are to comply with one of the following standards amended where necessary for ambient temperature and other environmental conditions:

(a) IEC 61439: *Low voltage switchgear and control gear assemblies* (relevant parts);
(b) IEC 62271-200*: High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*;
(c) IEC 62271-201: *High voltage switchgear and control gear — Part 201: AC insulation-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV;*
(d) IEC 60255: ~~*Electrical relays*~~ *Measuring relays and protection equipment*;
(e) acceptable and relevant National Standard.

In addition, the requirements of 7.2 to ~~7.18~~ 7.19 are to be complied with.

7.3 Circuit-breakers

7.3.1 Circuit-breakers are to comply with one of the following standards amended where necessary for ambient temperature:

(a) IEC 60947-2: ~~*Low voltage switchgear and Control gear Pt 2: circuit breakers*~~ *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*; or
(b) IEC ~~60056: *High voltage alternating current circuit-breakers*~~ 62271-100: *High-voltage switchgear and controlgear – Part 100: Alternating current circuit-breakers*; or
(c) an acceptable and relevant National Standard.

Type test reports to verify the characteristics of a circuit-breaker are to be submitted for consideration when required.

7.4 Contactors

7.4.1 High-voltage contactors are to comply with one of the following standards amended where necessary for ambient temperature.

(a) IEC ~~60470: *High-voltage alternating current contactors.*~~ 62271-106: *High-voltage switchgear and controlgear – Part 106: Alternating current contactors, contactor-based controllers and motor-starters*; or
(b) an acceptable and relevant National Standard.

Type test reports to verify the characteristics of a contactor are to be submitted for consideration when required.

7.5 Creepage and clearance distances

~~*7.5.1* The shortest distances between conductive parts and between conductive parts and earth in air or along the surface of an insulating material, are to be suitable for the rated voltage having regard to the nature of the insulating material and the transient over voltages developed by~~

~~switching and fault conditions. This requirement may be satisfied by subjecting each assembly type to an impulse voltage test in accordance with its constructional Standard or, alternatively, maintaining the minimum distances for bare conductive parts in switchgear and control gear assemblies given in Table 2.7.1.~~

~~*7.5.2* Suitable shrouding or barriers are to be provided in way of connections to equipment, where necessary, to maintain the minimum distances in Table 2.7.1.~~

~~*7.5.3* Switchgear and control gear assemblies for rated voltages up to and including 1 kV are to have creepage distances in accordance with IEC 60092-302, *Electrical installations in ships – Part 302: Low-voltage switchgear and control gear assemblies*, and Table 2.7.2.~~

~~*7.5.4* For switchgear and control gear assemblies for rated voltages up to and including 1 kV, a minimum creepage distance of 16 mm is permitted for type tested assemblies. The type tests are to include verification of the degree of protection, insulation material group and creepage and clearance distances in accordance with IEC 61439-1, *Low-voltage switchgear and control gear assemblies – Part 1: General Rules*.~~

~~*7.5.5* Switchgear and control gear assemblies for rated voltages above 1 kV are to have creepage distances in accordance with IEC 60092-503, *Electrical installations in ships – Part 503: Special features – AC supply systems with voltages in the range of above 1 kV up to and including 15 kV*. In the absence of alternative proposals, including supporting design rationale, the distances stated in Table 2.7.2 are to be used, *see also* 1.2.16.~~

~~*7.5.6* For switchgear and control gear assemblies for rated voltages of 1 kV and above, the type testing stated in Table 2.7.1 is to include verification of the degree of protection in accordance with a relevant International or National Standard.~~

7.5.1 The shortest distances between conductive parts and between conductive parts and earth, in air or along the surface of an insulating material, are to be suitable for the rated voltage having regard to:

- the nature of the insulating material;
- the transient over voltages developed by switching and fault conditions; and
- the environment into which the assembly will be installed.

Each assembly type is to be subjected to an impulse voltage test in accordance with its constructional Standard or, alternatively, the minimum distances for bare conductive parts in switchgear and control gear assemblies given in Table 2.7.1 are to be used.

7.5.2 For assemblies with a rated voltage of up to and including 1kV, the requirement of 7.5.1 may be met by complying with IEC 60092-302 *Electrical installations in ships – Part 302: Low-voltage switchgear and control gear assemblies.*

- Tables 2.7.1 and 2.7.2 indicate the minimum clearance and creepage distances normally allowed.
- For assemblies installed in spaces where the environmental conditions are in excess of pollution degree 3 (that is conductive pollution occurs or dry, non-conductive pollution occurs which is expected to be conductive due to condensation) as defined in IEC 61439-1, *Low-voltage switchgear and control gear assemblies – Part 1: General requirements*; the clearance distances for non-verified assemblies are to be used.
- A minimum creepage distance of 16 mm is permitted for assemblies verified in accordance with the requirements of IEC 61439-2, *Low-voltage switchgear and control gear assemblies – Part 2: Power switchgear and control gear assemblies.*
- An alternative relevant National or International Standard may be used when an acceptable justification is submitted as part of the documentation required by 1.3.4.

7.5.3 For assemblies with a rated voltage above 1kV, the requirement of 7.5.1 may be met by complying with IEC 60092-503 *Electrical installations in ships – Part 503: Special features – AC supply systems with voltages in the range of above 1 kV up to and including 15 kV*.

- Tables 2.7.1 and 2.7.2 indicate the minimum clearance and creepage distances normally allowed.
- For main switchboards rated at above 1kV, a minimum clearance distance of 25 mm is required for busbars and other bare conductors.

An alternative relevant National or International Standard may be used when an acceptable justification is submitted as part of the documentation required by 1.3.4.

7.5.4 Suitable shrouding or barriers are to be provided in way of connections to equipment, where necessary, to maintain the minimum distances in Table 2.7.1.

~~**Table 2.7.1 Minimum clearance distances**~~

Nominal voltage (V)	Minimum clearance distance (mm)			
	Main switchboards		Other switchgear and control gear	
	Type-tested assemblies	Non-type-tested assemblies	Type-tested assemblies	Non-type-tested assemblies
≤ 250	8	15	6	15
>250 to ≤690	8	20	6	20
>690 to 1000	8	25	6	25
<1100	14	14	14	14
<3300	32	55	26	55
<6600	60	90	50	90
<11 000	100	120	80	120
≤15 000	100	160	100	160

NOTE
A minimum clearance distance of 25 mm is required for busbars and other bare conductors in main switchboards.

Table 2.7.1 Minimum clearance distances

Nominal voltage (V)	Minimum clearance distance (mm)		
	Verified assemblies, *see* Note 2		Non-verified assemblies
	Main switchboards	Other switchgear and control gear	Main switchboards and other switch and control gear
≤ 250 (*see* Note 1)	8	8	15
≤ 690 (*see* Note 1)	8	8	20
≤ 1000 (*see* Note 1)	8	8	25
< 3,300	32	26	55
< 6,600	60	50	90
< 11,000	100	80	120
≤15,000	*See* Note 3	*See* Note 3	160

NOTES
1. For assemblies installed in spaces where the pollution degree is > 3, *see* 7.5.2.
2. For the verification requirements for a verified assembly refer to IEC 61439-2.
3. Clearance distances with reference to the applicable relevant National or International Standards, are to be submitted for approval, *see* 1.3.4.

~~**Table 2.7.2 Minimum creepage distances**~~

~~Nominal voltage (V)~~	~~Minimum creepage distance (mm)~~	
	~~Main switchboards~~	~~Other switchgear and control gear~~
~~250~~	~~20~~	~~20~~
~~>250 to ≤690~~	~~25~~	~~25~~
~~>690 to 1000~~	~~35~~	~~35~~
~~<3300~~	~~48~~	~~35~~
~~<6600~~	~~90~~	~~70~~
~~<11,000~~	~~150~~	~~120~~
~~≤15,000~~	~~150~~	~~120~~

~~NOTE~~
~~A minimum creepage distance of 16 mm is permitted for type-tested assemblies for rated voltages up to and including 1 kV, *see* 7.8.4.~~

Table 2.7.2 Minimum creepage distances

Nominal voltage (V)	Minumum creepage distance (mm)	
	Main switchboards	Other switchgear and control gear
≤ 250 (*see* Note 1)	20	20
≤ 690 (*see* Note 1)	25	25
≤ 1000 (*see* Note 1)	35	35
< 3,300	48	*See* Note 2
< 6,600	90	70
< 11,000	150	120
≤15,000	*See* Note 2	*See* Note 2

NOTES
1. For verified assemblies a minimum creepage distance of 16 mm is permitted for LV switchboards, *see* 7.5.2.
2. Creepage distances, with reference to the applicable relevant National or International Standards, are to be submitted for approval, *see* 1.3.4.

7.8 Earthing of high-voltage switchboards

7.8.2 Protective shutters associated with withdrawable parts are to be clearly marked~~, e.g. by colour coding,~~ to indicate the incoming and outgoing circuits and bus tie connections. The colour coding shall be as follows:

- Incoming (busbar side) – red;
- Outgoing (Circuit side) – yellow; and
- Bus ties – red.

7.9 Fuses

7.9.1 Fuses are to comply with one of the following standards amended where necessary for ambient temperature.

(a) IEC 60269: *Low-voltage fuses* (all parts);
(b) IEC 60282-1: *High-voltage fuses — Part 1: Current-limiting fuses*;
(c) acceptable and relevant National Standard for enclosed current-limiting fuses.

Type test reports to verify the characteristics of a fuse are to be submitted for consideration when required.

7.16 Position of switchboards

7.16.5 For switchgear and control gear assemblies, for rated voltages above 1 kV, arrangements are to be made to protect personnel in the event of gases or vapours escaping under pressure as the result of arcing due to an internal fault. Where personnel may be in the vicinity of the equipment when it is energised, this may be achieved by an assembly that has been tested in accordance with Annex A of IEC 62271-200-2011: *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV* and qualified for classification **IAC** (internal arc classification).

7.18 Testing

7.18.5 For switchgear and control gear assemblies, for rated voltages above 1 kV, type tests are to be carried out, in accordance with Annex A of IEC 62271-200-2011: *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV* and **IAC** (internal arc classification) assigned, to verify that the assembly will withstand the effects of an internal arc occurring within the enclosure at a prospective fault level equal to, or in excess of, that of the installation.

7.19 Disconnectors and switch-disconnectors

7.19.1 Disconnectors, switch-disconnectors and their components are to comply with one of the following standards, amended where necessary for ambient temperature and other environmental conditions:

(a) IEC 60947-3: ~~*Low voltage switchgear and control gear Part 3: switches, disconnectors, switch-disconnectors and fuse combination units*.~~ *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*;

(b) IEC ~~60129: *Alternating current disconnectors (isolators) and earthing switches*.~~ 62271-102: *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*;

(c) Acceptable and relevant National Standard.

Type test reports to verify the characteristics of a disconnector or switch-disconnector are to be submitted for consideration when required.

■ *Section 9*
Rotating machines

9.1 General requirements

9.1.1 Rotating machines are to comply with the relevant part of IEC 60092~~,~~: *Electrical installations in ships* or an acceptable and relevant National Standard, and the requirements of this Section.

9.1.6 The rotating parts of machines are to be so balanced that when running at any speed in the normal working range the vibration does not exceed the levels of IEC 60034~~: *Rotating electrical machines*, Part 14~~ -14: *Rotating electrical machines – Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity*.

9.8 Survey and testing

9.8.4 An impulse test is to be carried out on the coils of high voltage machines in accordance with IEC 60034-15: *Rotating electrical machines – Part 15: Impulse voltage withstand levels of form-wound stator coils for rotating a.c. machines*, in order to demonstrate a satisfactory withstand level of the inter-turn insulation to voltage surges. The test is to be carried out on all coils after they have been inserted in the slots and after wedging and bracing. Each coil shall be subjected to at least five impulses of injected voltage, the peak value of the injected voltage being given by the formula:

V_{peak} = 2,45V

where

V = rated line voltage r.m.s.

Alternative proposals to demonstrate the withstand level of inter-turn insulation will be considered.

■ *Section 10*
Converter equipment

10.1 Transformers

10.1.2 Transformers are to comply with the requirements of IEC 60076 (all parts): *Power transformers*, or an acceptable and relevant National Standard amended where necessary for ambient temperature, *see* 1.9.

10.2 Semiconductor ~~equipment~~ converters

10.2.1 The requirements of 10.2.2 to 10.2.18 apply to semiconductor ~~equipment~~ converters rated for 5 kW upwards.

10.2.2 Semiconductor ~~equipment is~~ converters are to comply with the requirements of IEC 60146 (all parts): *Semiconductor converters*, or an acceptable and relevant National Standard amended where necessary for ambient temperature, *see* 1.9.

10.2.3 Semiconductor static power converters ~~equipment is~~ are to be rated for the required duty having regard to peak loads, system transients and overvoltage.

10.3 Uninterruptible power systems

10.3.2 UPS units are to be constructed in accordance with IEC 62040 (all parts): *Uninterruptible power systems (UPS)*, or an acceptable and relevant National or International Standard.

10.3.8 UPS units utilising valve-regulated sealed batteries may be located in compartments with standard marine or industrial electrical equipment provided that the arrangements comply with 12.3.5. Ventilation arrangements in accordance with IEC 62040-1: *Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS*, or an acceptable and relevant National or International Standard, may be considered to satisfy the requirements of 12.5.10.

■ *Section 11*
Electric cables, optical fibre cables and busbar trunking systems (busways)

11.1 General

Table 2.11.1 Electric cables

Application	IEC Standard	Title
General constructional and testing requirements	60092–350	~~Low voltage shipboard power cables. General construction and test requirements~~ Electrical installations in ships – Part 350: General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications
Fixed power and control circuits	60092–353	~~Single and multicore non-radial field power cables with extruded solid insulation for rated voltages 1kV and 3kV~~ Electrical installations in ships – Part 353: Power cables for rated voltages 1 kV and 3 kV
Fixed power circuits	60092–354	~~Single and three-core power cables with extruded solid insulation for rated voltages 6kV, 10kV and 15kV~~ Electrical installations in ships – Part 354: Single- and three-core power cables with extruded solid insulation for rated voltages 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)
Instrumentation, control and communication circuits up to 60 V	60092-370	Shipboard telecommunication cables and radio frequency cables – General instrumentation, control and communication cables
Control and instrumentation circuits up to 250 V	60092–376	~~Shipboard multicore cables for control and instrumentation circuits~~ Electrical installations in ships – Part 376: Cables for control and instrumentation circuits 150/250 V (300 V)
Mineral insulated	60702 (all parts)	Mineral insulated cables and their terminations with a rated voltage not exceeding 750 V

11.2 Testing

11.2.1 Routine tests, consisting of at least:

(a) measurement of electrical resistance of conductors;
(b) high voltage test, *see also* Section 21;
(c) insulation resistance measurement;
(d) for high voltage cables, partial discharge tests are to be made in accordance with the requirements of ~~the relevant publication~~ IEC 60885-2: *Electrical test methods for electric cables – Part 2: Partial discharge tests* or an acceptable and relevant National Standard ~~referred to in 11.1.2~~ at the manufacturer's works prior to despatch.

Evidence of successful completion of routine tests is to be provided by the manufacturer.

11.5 Construction

11.5.3 Where electric or optical fibre cables are required to be of a 'fire resistant type', they are in addition to be easily distinguishable and to comply with the performance requirements of the appropriate part of IEC 60331:*Tests for electric cables under fire conditions - Circuit integrity*, when tested with a minimum flame application time of 90 minutes, as follows:

IEC 60331-1: *Tests for electric cables under fire conditions - Circuit integrity - Part 1: Test method for fire with shock at a temperature of at least 830°C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter ~~exceeeding~~ exceeding 20 mm*;
IEC 60331-21*: Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0.6/1.0kV;*
IEC 60331-23: *Tests for electric cables under fire conditions – Circuit integrity – Part 23: Procedures and requirements – Electric data cables;*
IEC 60331-25: *Tests for electric cables under fire conditions – Circuit integrity – Part 25: Procedures and requirements – Optical fibre cables*.

11.8 Installation of electric cables

11.8.10 Where electric and optical fibre cables are installed in bunches, provision is to be made to limit the propagation of fire. This requirement is considered satisfied when cables of the bunch have been tested in accordance with the requirements of IEC 60332-3-22:*Tests on electric and optical fibre cables under fire conditions~~,~~ – Part 3-22~~,~~: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A*, and are installed in the same configuration(s) as are used for the test(s). If the cables are not so installed, information is to be submitted to demonstrate satisfactorily ~~demonstrate~~ that suitable measures have been taken to ensure that an equivalent limit of fire propagation will be achieved for the configurations to be used. Particular attention is to be given to cables in:

- atria or equivalent spaces; and
- vertical runs in trunks and other restricted spaces.

In addition, cables that comply with the requirements of IEC 60332-3-22 are also required to meet the requirements of IEC 60332-1-2*: Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*.

11.13 Non-metallic cable support systems, protective casings and fixings

11.13.7 Non-metallic fixings are to be flame retardant in accordance with the requirements of IEC 60092-101: *Electrical installations in ships – Part 101: Definitions and general requirements*, or an alternative~~,~~ relevant National or International Standard.

■ *Section 12*
Batteries

12.3 Location

12.3.10 Only electrical equipment necessary for operational reasons and for the provision of lighting is to be installed in compartments provided in compliance with 12.3.1, the compartment ventilation exhaust ducts and zones within a 1,5 m radius of the ventilation outlet(s). Such electrical equipment is to be certified for group IIC gases and temperature Class T1 in accordance with the applicable parts of IEC 60079: ~~*Electrical apparatus for explosive gas atmospheres*~~ *Explosive atmospheres*, or an acceptable and relevant National Standard*.*

■ *Section 14*
Electrical equipment for use in explosive atmospheres

14.1 General

14.1.1 Electrical equipment is not to be installed in areas where an explosive atmosphere may be present, except where necessary for operational and/or safety purposes, when the equipment is to be of a certified safe type as listed below and details of the equipment and installation are to be submitted for consideration. The construction and type testing is to be in accordance with the relevant parts of IEC 60079: ~~*Electrical Equipment for*~~ *Explosive* ~~*Gas A*~~*atmospheres* or an acceptable and relevant National Standard.

Intrinsically safe – Ex 'i'
Increased safety – Ex 'e'
Flameproof – Ex 'd'
Pressurised enclosure – Ex 'p'
Powder filled – Ex 'q'
Encapsulated – Ex 'm'

14.1.4 For craft with spaces for carrying vehicles or craft with fuel in their tanks for their own propulsion, the following requirements are also applicable:

(a) electrical equipment fitted within a height of 45 cm above the vehicle deck, or any platform on which vehicles are carried, or within the exhaust ventilation trunking for the space, is to be of a safe type;

(b) electrical equipment situated elsewhere within the space is to have an enclosure of ingress protection rating of at least IP55, if not of a safe type. (*See* IEC 60529: ~~*Classification of Degrees of Protection Provided by Enclosures*~~ *Degrees of protection provided by enclosures (IP Code)*). Smoke and gas detector heads are exempt from this requirement.

■ *Section 18*
Crew and passenger emergency safety systems

18.4 Escape route or low location lighting (LLL)

18.4.4 The performance and installation of lights and lighting assemblies are to comply with ISO standard 15370: *Ships and marine technology – Low location lighting on passenger ships – Arrangement*.

■ *Section 19*
Craft safety systems

19.1 Watertight doors

19.1.5 The enclosures of electrical components necessarily situated below the waterline in the final condition of damage or below the bulkhead deck as applicable are to provide suitable protection against the ingress of water with ratings as defined in IEC 60529: *Degrees of protection provided by enclosures (IP Code)* or an acceptable and relevant ~~n~~National ~~s~~Standard, as follows:

(a) Electrical motors, associated circuits and control components, protected to IPX7 Standard.

(b) Door position indicators and associated circuit components protected to IPX8 Standard, where the water pressure testing of the enclosures is to be based on the pressure that may occur at the location of the component during flooding for a period of 36 hours.

(c) Door movement warning signals, protected to IPX6 Standard.

■ *Section 20*
Cargo craft, patrol and pilot craft, workboats and other similar craft of less than 500 tons gross tonnage for operation in Service Groups 1 to 3, and yachts less than 500 gt

20.1 General requirements

20.1.4 Alternative arrangements, including those in accordance with IEC 60092-507:~~2008-01,~~ *Electrical installations in ships – Part 507: Small vessels*, or a relevant International or National Standard acceptable to LR may be considered.

20.13 Lightning conductors

20.13.1 Lightning conductors complying with IEC 60092-401: *Electrical installations in ships – Part 401: Installation and test of completed installation* are to be fitted to each mast of all wood, composite and steel craft having wooden masts or topmasts. They need not be fitted to steel craft having steel masts.

Part 17, Chapter 3

Fire Protection, Detection and Extinction – Yachts

Effective date 1 July 2014

Section 3
Fire safety measures for yachts 500 gt or more

3.15 Structural fire protection – Means of escape

(*Part only shown*)
3.15.1 Stairways and ladders are to be arranged to provide ready means of escape to the survival craft embarkation deck from all guest and crew spaces and from spaces in which the crew is normally employed, other than machinery spaces. In particular, the following provisions are to be complied with:

(e) At least one of the means of escape required by (a) or (b) is to be by means of a readily accessible enclosed stairway, which will provide continuous fire shelter from the level of its origin to the appropriate survival craft embarkation decks, or the uppermost weather deck if the embarkation deck does not extend to the main vertical zone being considered. In the latter case, direct access to the embarkation deck by external open stairways and passageways is to be provided and is to have emergency lighting and slip-free surfaces underfoot. Boundaries facing external open stairways and passageways forming part of an escape route and boundaries in such a position that their failure during a fire would impede escape to the embarkation deck, are to have fire integrity and insulation values in accordance with Tables 3.3.2 and 3.3.3. The widths, number and continuity of escape routes are to be as follows:

(v) With the exception of intermediate landings, ~~L~~landings at each deck level ~~are to~~ shall be not less than 2 m^2 in area and ~~are to be increased~~ shall increase by 1 m^2 for every 10 persons provided for in excess of 20 persons but need not exceed 16 m^2, except for those landings serving public spaces having direct access onto the stairway enclosure. Intermediate landings shall be sized in accordance with paragraph (iii).

Part 17, Chapter 4

System and Equipment Specifications

Effective date 1 July 2014

Section 1
Automatic sprinkler, fire detection and fire-alarm systems

1.2 Wet pipe type

1.2.7 Sprinklers are to be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 5 litres per square metre per minute over the nominal area covered by the sprinklers. For this purpose, the nominal area shall be taken as the gross horizontal projection of the area to be covered. The use of sprinklers providing other amounts of water suitably distributed, will be considered provided they are shown to be not less effective.

Section 3
Fixed fire-extinguishing systems in machinery spaces

3.1 Gas fire-extinguishing systems

3.1.14 Where the quantity of extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected. Adjacent spaces with independent ventilation systems not separated by at least A-0 class divisions are to be considered as the same space.

3.1.15 Means are to be provided for the crew to safely check the quantity of medium in the containers. It shall not be necessary to move the containers completely from their fixing position for this purpose. For carbon dioxide systems, hanging bars for a weighing device above each bottle row, or other means shall be provided. For other types of extinguishing media, suitable surface indicators may be used.

Cross-references

Section numbering in brackets reflects any Section renumbering necessitated by any of the Notices that update the current version of the Rules for Special Service Crafts.

Part 10, Chapter 1

13.3.2(a)	Reference to sub-Section Pt 16, Ch1,2.5.11 *now reads* 2.5.10
13.3.2(c)	Reference to sub-Section Pt 16, Ch1,2.3.14 *now reads* 2.3.13
13.3.2(c)	Reference to sub-Section Pt 16, Ch1,2.4.6 *now reads* 2.4.5
13.3.2(c)	Reference to sub-Section Pt 16, Ch1,2.5.5 *now reads* 2.5.4

Part 16, Chapter 1

2.4.3 now *2.4.2*	Reference to sub-Section 2.4.2(c) *now reads* 2.4.1(c)
2.4.4 now *2.4.3*	Reference to sub-Section 2.4.2(a) *now reads* 2.4.1(a)
2.4.4 now *2.4.3*	Reference to sub-Section 2.4.2(b) *now reads* 2.4.1(b)
2.5.10 now *2.5.9*	Reference to sub-Section 2.5.7 *now reads* 2.5.6
2.10.8	Reference to sub-Section 1.2.5 *now reads* 1.2.6
2.10.10	Reference to sub-Section 1.2.5 *now reads* 1.2.6
2.11.7	Reference to sub-Section 2.5.5 *now reads* 2.5.4
2.14.3	Reference to sub-Section 1.2.5 *now reads* 1.2.6
2.14.5	Reference to sub-Section 2.4.6 *now reads* 2.4.5
2.14.5	Reference to sub-Section 2.5.5 *now reads* 2.5.4
7.1.3	Reference to sub-Section 1.2.5 *now reads* 1.2.6

Part 16, Chapter 2

1.11.4	Reference to sub-Section 1.16.4 *now reads* 1.16.5
17.6.12	Reference to sub-Section Ch1,2.6.7 *now reads* Ch1,2.6.6

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